

Serial No. : 10/700,214  
Filed : November 3, 2003

IN THE SPECIFICATION:

Please amend the specification as follows:

(1) The paragraph from page 1, line 26 to page 2, line 2 has been amended as follows:

According to the proposed technology, a larger amount of controllable plate current can be extracted by supplying a positive voltage to the grid terminal than the conventional method where a negative voltage is supplied to the grid terminal. However, in the proposed technology, in order to achieve an ~~election~~ electron emission action, a rated voltage has to be supplied to the heater and a high voltage has to be supplied to the plate terminal. Thus, the vacuum tube circuit in the proposed technology consumes a relatively large amount of power.

(2) The paragraph from page 2, line 9 to page 2, line 11 has been amended as follows:

It is another ~~an~~ object of the present invention to provide a vacuum tube circuit with low voltage and low power consumption which fits to a battery operation.

(3) The paragraph from page 3, line 24 to page 4, line 2 has been amended as follows:

A signal source 10 for generating an audio signal is connected to the other end of the resistor (Rg1) 42 through a capacitor 50. One end of a resistor (Rg2) 44 is also connected to the other end of the resistor (Rg1) 42. The

Serial No. : 10/700,214  
Filed : November 3, 2003

other end of the register (Rg2) 44 is connected to a variable resistor (voltage divider) 46. The source voltage +4V is also supplied to the variable register 46. Therefore, the same low positive source voltage +4V is supplied to one end of the resistor (RL) 40 connected to the plate terminal 21, to the variable register 46, and to the heater 25. Consequently, the voltage at the plate terminal 21 becomes a low positive voltage as well. The low voltage based vacuum tube amplifier circuit of the present invention is configured as described above.

(4) The paragraph from page 5, line 3 to page 5, line 2 has been amended as follows:

Since the resistor (Rg1) 42 is connected, when the grid current  $I_g$  increases, a voltage across the resistor (Rg1) 42 also increases, which limits the voltage increase at the grid terminal 23. Thus, the voltage at the grid terminal 23 becomes, for example, about +1V. At the plate terminal ~~30~~ 21 (output terminal 30), because of the voltage drop across the resistor (RL) 40 by the plate current, the output voltage is decreased to a low voltage of, for example, +1V.

(5) The paragraph from page 6, line 32 to page 7, line 13 has been amended as follows:

In addition, two resistors R1 having the same resistance value are series connected and the +4(V) source voltage is supplied to one end of the two series connected resistors R1,

Serial No. : 10/700,214  
Filed : November 3, 2003

where the other end thereof is connected to the grounded. The connection point of the two resistors R1 is connected to an inverting input terminal of a differential amplifier 60. As shown in Figure 2, the integration circuit 65 is connected between the plate terminal 30 21 (output terminal 30) and a non-inverting input terminal of the differential amplifier 60. Also, a resistor R2 and a capacitor C2 are connected in a parallel fashion between the output terminal and the inverting input terminal of the differential amplifier 60. As is known in the art, the capacitor C2 and the differential amplifier 60 form an integrator to remove noises. The output of the differential amplifier 60 is connected to the grid terminal 23 through the resistors Rg1 and Rg2, thereby forming a negative feedback loop.

(6) The paragraph from page 7, line 14 to page 7, line 26 has been amended as follows:

In this example, a voltage gain of the differential amplifier 60 is calculated by dividing the "sum of resistance values of the resistor R2 and the two combined ~~two~~ resistors R1" by the "resistance value of the two combined resistors R1". Therefore, in the case where  $R1=20k\Omega$ ,  $R2=1M\Omega$ , the voltage gain of the differential amplifier 60 becomes  $(10k+1M)+10k=101$ . Since the values of the two resistors R1 are the same, the voltage at the inverting input of the differential amplifier 60 (point A) becomes +2V, which is half

Serial No. : 10/700,214  
Filed : November 3, 2003

of the +4V source voltage. The voltage at the point A, i.e., +2V in this example is a reference voltage to automatically control the output bias voltage of the vacuum tube 20 through the negative feedback loop.

(7) The paragraph from page 8, line 14 to page 8, line 24 has been amended as follows:

The bias control function of the vacuum tube circuit will be explained next. When the voltage at the point B of Figure 2 (at the non-inverting input terminal of the differential amplifier 60) which is an average voltage of the plate output terminal 30 created by the integration circuit 65 becomes larger than the voltage +2V supplied to the inverting input terminal of the differential amplifier 60, the output of the differential amplifier 60 becomes positive. As a result, the positive voltage of the grid terminal 23 increases, and thus, the electrons released from the cathode terminal 22 are more easily attracted to the grid 23.